

# Description of self and previous work for Campam '06

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My two major jobs have been for the companies Digidesign (5 years) and The MathWorks (1.5 years). At Digidesign (a division of Avid), I worked on real-time audio digital signal processing software (ProTools). At The MathWorks, I worked on block diagram software for control design automation (Simulink/Real-time Workshop).

In particular, at Digidesign, I worked on DSP software for things like filters, dynamics processors, and sample rate converters. I also worked on software infrastructure to support such DSP software, e.g. a miniature real-time operating system. This software ran on off-the-shelf computers and custom hardware (array of up to 81 Motorola DSPs connected by custom network ASICs).

In particular, at The MathWorks, I did various work in the engine (guts) of Simulink/RTW (e.g. code generation). I also worked on understanding various problems in Simulink semantics, but unfortunately I didn't stay long enough to be able to fix many!

My academic work grew out of my interest in pursuing solutions to the problems I encountered at The MathWorks. Currently I pursue these problems independently, i.e. without pay or affiliation.

My work concerns the semantics of block diagram languages. One focus has been issues related to cyclic block diagrams: which ones are legal/terminating and which ones are not. Another focus has been the integration of continuous and discrete block diagrams. A third focus has been the relationship between "stateful" and stream-based block diagram languages.

In the future I plan to investigate the integration of state transition diagrams and block diagrams, like Stateflow and Simulink. I have some confidence that this can be done via the monadic techniques that have been successful in integrating imperative programming styles into functional languages.

At this workshop I hope to get some feedback on my block diagram work. Perhaps more importantly, I hope to learn about other people's work, which may suggest new directions for my own work.

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